

IN THE CLAIMS

Please cancel claims 1-57 without prejudice or disclaimer.

Please add claims 58-76 as indicated below.

This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

Claims 1-57 (canceled)

Claim 58 (new) A molecular electronic device, comprising:

- (a) a nanocell;
- (b) an input lead located at a first edge of said nanocell; and
- (c) an output lead located at a second edge of said nanocell, wherein
  - (i) said nanocell comprises a nano-network spanning from said input lead to said output lead;
  - (ii) said nano-network comprises molecular circuit components and nanoparticles;
  - (iii) said nanoparticles have a functionality of electrical connectors thereby aiding a formation of said molecular circuit components into a conductive network;
  - (iv) said molecular circuit components are programmed by applying a voltage across said input lead and said output lead; and
  - (v) said molecular circuit components are programmed in a manner that allows said molecular circuit components to self-assemble into a structure.

Claim 59 (new) The molecular electronic device as recited in claim 58, wherein said nanocell has a linear dimension between about 1 nm and 2  $\mu\text{m}$ .

Claim 60 (new) The molecular electronic device as recited in claim 58, wherein an x-ray crystal structure of said nano-network includes no appreciable peaks of a periodic arrangement of said molecular circuit components.

Claim 61 (new) The molecular electronic device as recited in claim 58, wherein an x-ray crystal structure of said nano-network includes no appreciable peaks of a semi-periodic arrangement of said molecular circuit components.

Claim 62 (new) The molecular electronic device as recited in claim 58, wherein an x-ray crystal structure of said nano-network includes at least one peak indicative of a lack of characteristic length scale between about 1 nm and 2  $\mu\text{m}$ .

Claim 63 (new) The molecular electronic device as recited in claim 58, wherein said nano-network creates itself from said molecular circuit components in response to a stimulus.

Claim 64 (new) The molecular electronic device as recited in claim 58, wherein said molecular circuit components comprise at least one of: molecular wires, molecular rectifiers, molecular diodes, molecular switches, molecular resistors, and molecular transistors.

Claim 65 (new) The molecular electronic device as recited in claim 64, wherein said molecular switches comprise 2',5'-dinitro-4,4'-diphenyleneethynylene-1,4'-benzenedithiol.

Claim 66 (new) The molecular electronic device as recited in claim 65, wherein at least one of said molecular switches are connected to one of said input lead and said output lead.

Claim 67 (new) The molecular electronic device as recited in claim 58, wherein said molecular circuit components include conjugated molecular segments.

Claim 68 (new) The molecular electronic device as recited in claim 58, wherein said molecular circuit components are programmed by a self-adaptive algorithm.

Claim 69 (new) The molecular electronic device as recited in claim 68, wherein said molecular circuit components comprise molecules for which a conductive-affecting property is adjustable by applying said voltage across said input lead and said output lead.

Claim 70 (new) The molecular electronic device as recited in claim 69, wherein said conductivity-affecting property is selected from a group consisting of: charge, conformational state, electronic state, and combinations thereof.

Claim 71 (new) The molecular electronic device as recited in claim 70, wherein said molecular circuit components comprise oligophenylene-based molecular wires and switches.

Claim 72 (new) The molecular electronic device as recited in claim 58, wherein at least one of said molecular circuit components includes a thiol group at each end.

Claim 73 (new) The molecular electronic device as recited in claim 58, wherein said nanoparticles are metallic.

Claim 74 (new) The molecular electronic device as recited in claim 58, wherein said molecular electronic device is programmable to function as a logic unit selected from a group consisting of AND, OR, XOR, NOR, NOT and NAND gates.

Claim 75 (new) The molecular electronic device as recited in claim 58, wherein said molecular electronic device is programmable to function as a logic unit selected from a group consisting of an adder, a half-adder, a multiplexor and a decoder.

Claim 76 (new) The molecular electronic device as recited in claim 58, wherein said molecular circuit components assemble into a random arrangement.